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MORRISON & FOERSTER LLP
425 MARKET STREET
SAN FRANCISCO, CA 94105-2482

EXAMINER	
DIRAMIO, JACQUELINE A	
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1641	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/560,138	BERGMAN ET AL.	
	Examiner	Art Unit	
	JACQUELINE DIRAMIO	1641	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 September 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-55* is/are pending in the application.

4a) Of the above claim(s) *13-16,21,24,26-52 and 54* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12,17-20,22,23,25,53 and 55* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 September 2009* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of the Claims

1. Applicant's amendments to claims 1, 2, 6 – 8, 10 – 12, 17, 19, and 22 are acknowledged, as well as the addition of new claim 55.

2. Currently, claims 1 – 55 are pending. Claims 1 – 12, 17 – 20, 22, 23, 25, 53 and 55 are under examination. Claims 13 – 16, 21, 24, 26 – 52 and 54 are acknowledged as withdrawn as drawn to non-elected inventions.

Withdrawn Objections and Rejections

3. All previous objections to the drawings are withdrawn in view of Applicant's amendments filed September 18, 2009.

4. All previous rejections of the claims under 35 U.S.C. 112, second paragraph, are withdrawn in view of Applicant's amendments filed September 18, 2009.

5. All previous rejections of the claims under 35 U.S.C. 102(e) and 103(a) are withdrawn in view of Applicant's amendments and arguments filed September 18, 2009.

Response to Arguments

6. Applicant's arguments, see page 16, filed September 18, 2009, with respect to the rejection(s) of the claim(s) under 35 U.S.C. 102(e) as being anticipated by Buechler (US 6,767,510) have been fully considered and are persuasive. In particular, Applicant's argument that Buechler fails to teach the amendments to claim 1, which require the separator element to

consist of first projections substantially vertical to said substrate surface, "**forming a gradient with regard to the diameter or reciprocal spacing of said first projections such that separation of the component** occurs," is found persuasive. Therefore, the rejections have been withdrawn. However, upon further consideration, a new ground(s) of rejection is made and presented below.

NEW GROUNDS OF REJECTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. Claims 1, 2, 6 – 12, 17, 18, 23, 53 and 55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buechler (US 6,767,510) in view of Ohman et al. (WO 03/103835).

Buechler teaches a device for the separation of a component in a liquid sample prior to the detection of an analyte in said liquid sample, said device having a non-porous substrate 9 comprising:

a sample addition (receiving) zone 1;

a substrate surface;

a sample reaction barrier 3 (separator element) wherein said sample reaction barrier consists of first grooves 12 (projections) substantially vertical to said substrate surface having a height, diameter, and reciprocal spacing, and wherein said sample reaction barrier is provided adjacent to said sample addition zone; and

a diagnostic element 6 (transport or incubation zone) connected to said sample addition zone, thereby forming a flow path on said substrate, wherein at least a part of said flow path consists of areas of projections or second grooves substantially vertical to said substrate surface, said projections or second grooves having a height, a diameter, and a reciprocal spacing such that lateral capillary flow of said liquid sample in said diagnostic element is achieved (see Figures 1, 1A, 5, 9B, 6C, and 15; column 3, lines 36-67; column 4, lines 1-67; column 5, lines 1-13; column 7, lines 45-60; column 8, lines 38-66; column 9, lines 2-67; column 10, lines 1-37; column 15, lines 61-65; column 16, lines 59-64; column 18, lines 6-26; and column 27, lines 48-52).

However, Buechler fails to teach that said first grooves (projections) within said sample reaction barrier (separator element) form a gradient with regard to the diameter or reciprocal spacing of said grooves such that separation of the component occurs.

Ohman et al. teach microfluidic systems, which comprise a substrate including a flow path that comprises a plurality of microposts (i.e. projections) substantially vertical to the substrate surface and being small enough to induce capillary action of a liquid sample applied to said flow path. The spacing between said plurality of microposts is selected not only to induce capillary action in a liquid sample applied anywhere to said flow path, but further the spacing between said microposts can be used to form a gradient, wherein the gradient can function to delay the passage of certain biological and/or chemical entities, such as particles, cells, organelles, macromolecules or the like, while allowing the unhindered passage of desired entities along the flow path. Further, the application of reactive substances, which have affinity for various biological and non-biological substances, to the surfaces of the substrate is provided in order to allow for the binding and removal of substances contained within the test sample that one wishes to separate from the sample (see Abstract; Figures 12 and 13; p4, lines 24-30; p5, line 1; p9, lines 19-25; p12, lines 16-24; and p13, lines 18-27).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to prepare the vertical grooves within the sample reaction barrier of Buechler with a certain diameter or reciprocal spacing so as to form a gradient as taught by Ohman et al. because Ohman et al. teach the benefit of preparing vertical microposts (i.e. projections/grooves) provided as a flow path on a substrate surface with a certain spacing in-between in order to form a gradient, because the gradient allows for delaying the passage of certain biological and/or chemical entities, such as particles, cells, organelles, macromolecules or the like, while allowing the unhindered passage of desired entities along the flow path.

With respect to Applicant's claim 2, Ohman teaches that the gradient with regard to the diameter or reciprocal spacing of said microposts is adapted to prevent said component from substantially leaving said receiving zone (see Figure 13; and p12, lines 16-24).

With respect to Applicant's claim 6, Buechler teaches that the first projections or grooves have a reciprocal spacing in the interval of 0.02 – 0.1 mm (i.e. 20 to 100 microns) (see column 9, lines 27-51).

With respect to Applicant's claims 7 and 8, Ohman teaches the formation of a gradient by varying the reciprocal spacing of microposts, wherein an optimum spacing is selected to delay the passage of certain biological and/or chemical entities (see Figure 13; and p12, lines 16-24).

With respect to Applicant's claim 9, Buechler teaches that said sample addition zone forms a reaction chamber 4 (basin) adapted to contain a part of the sample separation by said filter element or sample reaction barrier 3 (see Figure 1; column7, lines 50-56; and column 10, lines 31-37).

With respect to Applicant's claims 10-12, Buechler teaches the inclusion of a filter (i.e. second separator element) with the sample reaction barrier (first separator element) (see column 3, lines 3-9). Therefore, it would have been obvious to provide a reactive substance (i.e. compound) with the filter and/or sample reaction barrier of Buechler as taught by Ohman et al. because Ohman et al. teach the benefit of applying reactive substances, which have affinity for various biological and non-biological substances, to the surfaces of the substrate (i.e. projections or grooves) in order to allow for the binding and removal of substances contained within the test sample that one wishes to separate from the sample.

With respect to Applicant's claim 17, Buechler teaches that said sample addition zone forms a reaction chamber 4 (basin) adapted to contain a part of the sample separated by said filter element or sample reaction barrier 3 (see Figure 1; column7, lines 50-56; and column 10, lines 31-37).

With respect to Applicant's claim 18, Ohman et al. teach the inclusion of magnet in or around the flow path provided on the substrate in order to provide for the detection of magnetic substances, wherein coated magnetic particles can be included with the device in order to bind to and separate target assay substances for detection (see p13, lines 2-7). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include with the device of Buechler a magnet as taught by Ohman et al. in order to provide for the detection of magnetic substances, wherein coated magnetic particles can further be included with the device of Buechler in order to bind to and separate target assay substances for detection.

With respect to Applicant's claims 23 and 53, Buechler teaches that the substrate is plastic, such as a thermoplastic material (see column 6, lines 23-49).

With respect to Applicant's claim 55, Buechler teaches that said flow path on said substrate is open (see Figure 2).

8. Claims 3 – 5 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buechler (US 6,767,510) in view of Ohman et al. (WO 03/103835), as applied to claim 1 above, and further in view of Doshi et al. (US 5,660,798).

The Buechler and Ohman et al. references, which were discussed in the 103(a) rejection above, fail to teach that said sample addition zone further contains an enhancing element adapted

to enhance the separation capability of said sample reaction barrier (separator element), wherein said enhancing element are compounds capable of forming aggregates of said component to be separated.

Doshi et al. teach an apparatus for red blood cell separation, wherein the apparatus comprises at least one porous material that contains an agglutinating agent. The agglutinating agent is provided in order to rapidly agglutinate red blood cells contained within a test sample applied to the apparatus, wherein the agglutinating of the blood cells allows for the substantially complete removal of the red blood cells from the sample in order to conduct a downstream analyte assay of the sample, which is free from red blood cells capable of interfering with the assay results (see Abstract; Figure 3; column 5, lines 13-67).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include with the sample reaction barrier of Buechler and Ohman et al. an enhancing or agglutinating agent as taught by Doshi et al. because Doshi et al. teach the benefit of providing an agglutinating agent with a device used for applying a test sample and running an analyte assay because the agglutinating agent rapidly agglutinates red blood cells contained within an applied test sample, which allows for the substantially complete removal of the red blood cells from the sample in order to conduct a downstream assay of the sample, which is free from red blood cells capable of interfering with the assay results.

With respect to Applicant's claims 5 and 25, the time gate 5 taught by Buecher could also read on the separation element of the instant application, wherein the time gate can comprise latex particles that are provided adjacent to the sample addition zone (see Figures 1 and 1A; column 11, lines 34-57; and column 12, lines 22-28). Therefore, it would have been obvious to

include with these latex particles taught by Buechler an agglutinating agent as taught by Doshi et al. for the same reasons discussed directly above.

9. Claims 19, 20 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buechler (US 6,767,510) in view of Ohman et al. (WO 03/103835), as applied to claim 1 above, and further in view of Diamond (US 2002/0142351).

Buechler and Ohman et al. further fail to teach the separation element comprises an element for subjecting the sample to ultrasonic standing waves, wherein the device includes at least two ultrasonic energy sources.

Diamond teaches a peptide or protein microassay method and apparatus, wherein the apparatus comprises a substrate with a plurality of deposited microarray dots comprising peptides or proteins of interest. Preferably, the sample applied to the substrate is an aerosolized sample, wherein an aerosolized sample can be generated by applying ultrasonic waves to the test sample. The aerosolized sample generated by the ultrasonic energy has droplet sizes ranging from 1 to 25 micrometers, wherein the aerosolizing of the sample provides for focused sample application, which allows for the sample to be absorbed by the individual microarray dots while any excess sample droplets between the dots tend to either migrate toward the nearest dot to be absorbed or evaporate, thus preventing contamination (see Abstract; and paragraphs [0011], [0035], and [0054]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include with the device of Buechler and Ohman et al. a means for providing ultrasonic energy as taught by Diamond because Diamond teaches the benefit of providing a means to supply ultrasonic energy to a device and a sample that is applied to the

device in order to aerosolize the sample through the ultrasonic energy, which creates microdroplets of the sample allowing for focused sample application to a device substrate, which ultimately prevents contamination.

With respect to Applicant's claim 22, Buechler teaches that said sample addition zone forms a reaction chamber 4 (basin) adapted to contain a part of the sample separation by said filter element or sample reaction barrier 3 (see Figure 1; column7, lines 50-56; and column 10, lines 31-37).

Conclusion

10. No claims are allowed.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JACQUELINE DIRAMIO whose telephone number is (571)272-8785. The examiner can normally be reached on M-F 9-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Shibuya can be reached on 571-272-0806. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jacqueline DiRamio/
Examiner, Art Unit 1641

/GAILENE R. GABEL/
Primary Examiner, Art Unit 1641

1/16/2010